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Issued April 29, 1907.

United States Department of Agriculture,

FOREST SERVICE—CIRCULAR 90.

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FOREST PLANTING LEAFLET.

OSAGE ORANGE (*Toxylon pomiferum*).

FORM AND SIZE.

The Osage orange is a tree of medium size, with a short trunk, ridged scaly bark, and wide-spreading branches. The trunk is generally somewhat crooked and the top is inclined to be distorted and scraggy. Within its natural range, the tree occasionally reaches a height of 60 or 70 feet and a diameter of 2 feet. This size, however, is not attained elsewhere. It produces a compound globular fruit that looks somewhat like an orange, is yellow when ripe, and contains a large number of seeds.

RANGE.

The natural range of the Osage orange is from the Arkansas River south through southeastern Indian Territory to southern Texas. In the forest its principal associates are the oaks, elms, and hickories. It grows on rich bottom lands and fertile slopes and appears to be most abundant and to attain its greatest size in the valley of the Red River in Indian Territory. Cultivation has given it an artificial distribution of much greater extent.

The range of the Osage orange for economic planting includes the Middle Western States from central Illinois southward and westward to eastern Colorado and New Mexico. It is hardy as far north as Massachusetts, but is likely to be winterkilled during severe seasons in the northern part of Iowa, Nebraska, and Illinois.

HABITS AND GROWTH.

The Osage orange adapts itself to a great variety of soil and climatic conditions and within its planted range is surpassed in hardiness only by the red cedar. It will endure a great amount of neglect

and rarely succumbs to drought. This ability to withstand aridity makes it one of the most desirable trees for planting throughout the Middle West.

It is tolerant of shade and consequently well adapted for planting in mixture. The usual rate of growth under good conditions is one-quarter to one-third of an inch in diameter yearly. Height growth is relatively slow after the first few years, and no great height is ever reached. It equals the Russian mulberry in rate of growth, but falls somewhat behind the black locust. On good soil it will produce fence posts in about fifteen years.

Osage orange is usually free from any serious fungous attack. A specimen with decayed heartwood is seldom found, though the sapwood is sometimes riddled by borers. Their attack, however, rarely kills the tree or seriously retards its growth. If injury by insects is noted, however, specimens of the insects and their work should be sent to the Bureau of Entomology of the Department of Agriculture for identification and suggestions as to methods of control.

ECONOMIC USES.

The wood is yellow in color, heavy, tough, hard, and strong. It is used in the manufacture of machinery, wagon felloes, insulator pins, and tool handles. Where the tree attains sufficient size the wood is used for railroad ties.

The Osage orange is one of the most valuable trees for hedges and in its planted range has been used for this purpose more extensively than any other. Planting for fence-post material is also advisable. Aside from its value for hedge and wood-lot planting the Osage orange is one of the most desirable trees for windbreaks. Its tendency to branch freely makes it very suitable for a low, dense windbreak.

METHODS OF PROPAGATION.

Reproduction is abundant from seed, suckers, and stump sprouts. When an Osage orange is once established, its complete removal is a matter of much difficulty. Suckers from the roots will come up year after year. Sprout growth furnishes the best means of reproducing a plantation for posts or fuel. Since young shoots grow from the stump with great vigor, the second crop is more likely to consist of straight post timber than the first, unless the trees of the original plantation were cut back one or two years after planting. This ability to reproduce insures a continual renewal of the plantation without further expense.

The Osage orange may also be propagated from root cuttings, but this is not a practical method. Propagation from seed is not difficult. The pistillate trees bear "oranges" in abundance. These

should be collected in the fall as soon as ripe and kept in a cool, dry place over winter. Prolonged soaking in cold water softens the pulp so that the seed may be extracted. The seed germinates readily without preliminary treatment of any kind. It should be sown in nursery rows in rich, well-prepared soil. The seedlings will grow from 1 to 2 feet in height during the season and be ready to transplant to the permanent situation the following spring. Osage-orange seedlings are cheap, and the planter who does not wish to raise his own trees can get them at nurseries for \$1 to \$3 a thousand.

PLANTING.

Osage-orange trees should be set close to overcome the tendency toward profuse branching and should not be more than 3 feet by 6 feet or 4 feet by 6 feet apart. The species is well adapted for planting in mixture with intolerant species, such as black walnut, black locust, honey locust, and green ash.

CULTIVATION AND CARE.

Cultivation should be given several times each year until the ground is partly shaded or until the size of the trees prevents. Weeds and grass should be kept out at all times.

The roots of the Osage orange are wide spreading and are said to draw considerable nourishment from the surface soil to the detriment of adjacent field crops. This objectionable feature can largely be eliminated by inclosing the plantation with a plowed strip four or five furrows in width. This strip will also serve as an efficient fire guard.

If a plantation is accidentally burned over, the trees should be cut back immediately to encourage a new sprout growth. If the trees are left uncut the roots are likely to become weakened by disease, which gains entrance through the dead wood.

Since the trees rarely clear themselves of branches pruning is necessary if first-class post timber is desired. Moreover, pruning stimulates height growth.

EXAMPLES.

Probably the largest single plantation of Osage orange in the United States is a 10-acre block at Farlington, Kans. The plantation was established in 1878, and the trees set 4 feet apart each way. Agents of the Forest Service examined this tract in 1900. The trees had made a thrifty growth, and measurements disclosed the fact that the stand contained 2,640 first-class and 2,772 second-class fence posts per acre, worth, respectively, 12.5 and 7 cents each, or a total acreage value of \$524.04. The land could hardly have been put to any other use that would have brought greater returns.



